CONCLUSIONS & RECOMMENDATIONS

Applied research is valuable inasmuch as it provides decision makers with a basis for a course of action. Merely reporting the results of a survey provides a limited basis. This author therefore has drawn some conclusions from the data and offers the following recommendations:

1. Our first recommendation is that the information contained in this report be used as a contribution in the standards creation process. This is already beginning to occur. The results of this survey have been accepted by the Telecommunications Industry Association (TIA) at their "Joint Experts Meeting on Public 800 Mobile and Personal Communications Support of 9-1-1 and E9-1-1 Emergency Services."

2. As the Project 31 Committee becomes more structured, the results of this survey may form the basis of initial considerations by the users' subcommittee. Discussion of this research will provide feedback from personnel currently involved in today's PSAP operations and problems. This feedback could uncover facets of ALI requirements heretofore unimagined. It will also serve to validate or challenge the conclusions made by this researcher.

3. Emergency Caller Location Information must be presented to PSAP personnel in terms that are meaningful, regardless of the technology(ies) employed to provide it. Whether GPS or RDF or some other methods are used to fix an emergency caller's location, such data must not be displayed to call takers in its raw format (e.g., 35° 16' N, 85°42' W, 580' ASL). Rather the data must be translated into an address, or perhaps a point on a graphical map display.

4. Description of the caller's location must be displayed as fast as possible, preferably within 5 seconds of call receipt; certainly no longer than 10 seconds of call receipt.

5. If, in the near future, only ***approximate*** location data can be provided by the wireless industry, providing the caller's mobile telephone number should take precedence. This would include any Roaming access number needing to be dialed. A simpler (for PSAP staff) method of re-contacting a complainant would be the provisioning of immediate ring-back capability.

6. Caller Location data must be accurate to within 100 yards, or provide at least enough information to allow a responding police/fire/medical unit to locate the incident within two minutes of arrival at the scene of an incident.

7. As time, technology and PSAP requirements progress into the future, the ALI data base should be designed to easily accommodate additional fields of information. Two such fields identified in this survey are Common Place Name and Private Security

Agent telephone number. Other fields could include Subscriber medical conditions or language preference.

8. The wireless industry should strive to provide dynamic, real-time reporting of a mobile caller's changing location.

9. The provider of 9-1-1 service should assume responsibility for maintaining the ALI data base. Rules should be established to guarantee the cooperation of other telecommunication carriers (public or private) ensuring the accuracy and timeliness of the data.

10. Information about indoor locations should include, at a minimum:

- Complete Street Address (including City, County and Township, where applicable)
- Floor Number on which the caller is located
- Apartment or Room number
- Any commonly known or used name/number of the caller's building or building complex
- A specific area or section of a floor which is so expansive as to hinder immediate location of the caller
- The telephone number of any on-duty security agent located on the premises.

11. Some method will also have to be devised to provide as much of the above information with a wireless call made from indoors.

Wireless telephone technologies such as Cellular, PCS, and Satellite are expected to enhance the economics and quality of life throughout the world. As these portable devices become more available to the consumer, a major factor in their purchase decision will be the ability to summon help in times of emergency. Whether the need is for an ambulance on a Little League ball field, a police officer on a highway, a contingent of fire fighters in a national park, or a rescue team on the thirtieth floor of a high rise building, the public will expect to be able to obtain assistance through their wireless telephone.

A cooperative effort among the wireline and wireless carriers, the equipment manufacturers, and the PSAPs themselves is needed to solve the problems of Public Safety which will arise as technology advances. We hope that the research described in this article represents an initial step toward that cooperation.

DATA

The following pages contain the complete data tabulations from all 623 surveys.

NENA/APCO ALI SURVEY RESULTS

STATES/PROVINCES RESPONDING

STATE/PROVINCE	RESPONSES	STATE/PROVINCE	RESPONSES
Alabama	16	Nevada	4
Alaska	1	New Hampshire	3
Arkansas	4	New Jersey	5
Arizona	14	New Mexico	1
British Columbia	1	New York	11
California	43	North Carolina	28
Colorado	2	North Dakota	3
Connecticut	1	Ohio	26
Delaware	4	Oklahoma	5
Florida	55	Ontario	6
Georgia	21	Oregon	8
Idaho	3	Pennsylvania	16
Illinois	70	Quebec	2
Indiana	20	Rhode Island	1
Iowa	21	South Carolina	6
Kansas	5	South Dakota	1
Kentucky	15	Stockholm Sweden	1
Louisiana	17	Tennessee	12
Maryland	21	Texas	48
Massachusetts	5	Utah	3
Michigan	27	Vermont	1
Minnesota	6	Virginia	7
Mississippi	4	Washington	25
Missouri	15	West Virginia	2
Montana	1	Wisconsin	6

Total Returned: 623

JOB CATEGORIES

TITLE	*RESPONSES*	*%*
PSAP Manager/Administrator	362	59.15%
PSAP Supervisor	102	16.67%
Call Taker/Dispatcher	57	9.31%
Field Operations	3	0.49%
Administrative Support	88	14.38%
Totals:	612	100.00%

M. Celeski ---- PERTECH AMERICA, INC.

CALL BACK NUMBER vs. CALLER'S APPROX. LOCATION

		RESPONSES	%
Prefer Call Back Number		397	67.52%
Prefer Caller's Approximate Location		191	32.48%
	Totals:	588	100.00%

CALL BACK NUMBER vs. CALLER'S EXACT LOCATION

		RESPONSES	%
Prefer Call Back Number		83	14.12%
Prefer Caller's Exact Location		505	85.88%
	Totals:	588	100.00%

ALI DISPLAY — MAXIMUM DELAY ALLOWABLE

	RESPONSES	%
5 Seconds	377	61.40%
10 Seconds	176	28.66%
20 Seconds	33	5.37%
30 Seconds	22	3.58%
45 Seconds	6	0.98%
Totals:	614	100.00%

NENA/APCO ALI SURVEY RESULTS

DEGREE OF ACCURACY REQUIRED IN LOCATING OUTDOOR CALLER

	RESPONSES	%
440 Yards	16	2.68%
220 Yards	26	4.36%
100 Yards	185	30.99%
Sub Total:	227	38.02%
Within a Number of Minutes of Arrival:		
1	129	21.61%
2	133	22.28%
3	47	7.87%
4	14	2.35%
5	38	6.37%
6	2	0.34%
7	1	0.17%
8	1	0.17%
10	2	0.34%
15	3	0.50%
Sub Total:	370	61.98%
Totals:	597	100.00%

NENA/APCO ALI SURVEY RESULTS

CALLER'S OUTDOOR ALTITUDE REQUIRED?

	RESPONSES	%
Yes	83	13.65%
No	525	86.35%
Totals:	608	100.00%

CALLER'S INDOOR HEIGHT REQUIRED?

	RESPONSES	%
Yes	228	37.07%
No	387	62.93%
Totals:	615	100.00%

FREQUENCY OF MOBILE CALLER'S LOCATION REPORTING

	RESPONSES	%
When Transmitters Hand Off the Call	155	26.63%
Dynamically, Real-Time	354	60.82%
Other Answer Given	73	12.54%
Totals:	582	100.00%

COMMON PLACE NAME FIELD IN ALI DATABASE

	RESPONSES	%
Yes	579	94.15%
No	36	5.85%
Totals:	615	100.00%

PREFERRED MAINTAINER OF COMMON PLACE INFORMATION

	RESPONSES	%
Jurisdiction	123	21.32%
Comm. Center	81	14.04%
9-1-1 Provider	304	52.69%
Other Answer Given	69	11.96%
Totals:	577	100.00%

ON PREMISES SECURITY PHONE NUMBER FIELD IN ALI?

		RESPONSES	%
Yes		525	85.37%
No		90	14.63%
	Totals:	615	100.00%

CALL CONFERENCING WITH ON PREMISES SECURITY?

		RESPONSES	%
Yes		287	47.36%
No		319	52.64%
	Totals:	606	100.00%

NENA/APCO ALI SURVEY RESULTS

SINGLE FAMILY DWELLING LOCATION REQUIREMENTS

RATING:	*1*	*2*	*3*	*4*	Total
Street Address	1	0	10	608	619
	0.16%	0.00%	1.62%	98.22%	
Latitude/Longitude	131	264	185	24	604
	21.69%	43.71%	30.63%	3.97%	
Altitude	149	354	94	9	606
	24.59%	58.42%	15.51%	1.49%	
State Plane Coordinates	138	322	121	14	595
	23.19%	54.12%	20.34%	2.35%	
Location on Lot	42	135	330	102	609
	6.90%	22.17%	54.19%	16.75%	

MULTIPLE FAMILY DWELLING LOCATION REQUIREMENTS

RATING:	*1*	*2*	*3*	*4*	Total
Street Address	0	2	10	606	618
	0.00%	0.32%	1.62%	98.06%	
Latitude/Longitude	128	271	182	26	607
	21.09%	44.65%	29.98%	4.28%	
Altitude	133	333	113	22	601
	22.13%	55.41%	18.80%	3.66%	
State Plane Coordinates	128	321	125	17	591
	21.66%	54.31%	21.15%	2.88%	
Name of Complex	6	11	326	273	616
	0.97%	1.79%	52.92%	44.32%	
Bldg./Annex Name or #	3	8	202	402	615
	0.49%	1.30%	32.85%	65.37%	
Floor Number	4	11	197	402	614
	0.65%	1.79%	32.08%	65.47%	
Apt. Number	5	0	61	556	622
	0.80%	0.00%	9.81%	89.39%	

HOTEL/MOTEL/DORMITORY LOCATION REQUIREMENTS

RATING:	*1*	*2*	*3*	*4*	Total
Street Address	2	0	19	598	619
	0.32%	0.00%	3.07%	96.61%	
Latitude/Longitude	129	271	181	24	605
	21.32%	44.79%	29.92%	3.97%	
Altitude	137	335	101	23	596
	22.99%	56.21%	16.95%	3.86%	
State Plane Coordinates	126	322	128	16	592
	21.28%	54.39%	21.62%	2.70%	
Name of Complex	1	9	258	349	617
	0.16%	1.46%	41.82%	56.56%	
Bldg./Annex Name or #	4	7	198	408	617
	0.65%	1.13%	32.09%	66.13%	
Floor Number	6	11	164	438	619
	0.97%	1.78%	26.49%	70.76%	
Apt. Number	4	2	70	541	617
	0.65%	0.32%	11.35%	87.68%	

COMMERCIAL/OFFICE/SCHOOL/INDUSTRIAL LOCATION REQUIREMENTS

RATING:	*1*	*2*	*3*	*4*	Total
Street Address	1	2	17	598	618
	0.16%	0.32%	2.75%	96.76%	
Latitude/Longitude	130	267	182	29	608
	21.38%	43.91%	29.93%	4.77%	
Altitude	136	343	97	20	596
	22.82%	57.55%	16.28%	3.36%	
State Plane Coordinates	127	321	129	16	593
	21.42%	54.13%	21.75%	2.70%	
Name of Complex	1	9	244	361	615
	0.16%	1.46%	39.67%	58.70%	
Bldg./Annex Name or #	2	7	184	423	616
	0.32%	1.14%	29.87%	68.67%	
Floor Number	4	8	183	420	615
	0.65%	1.30%	29.76%	68.29%	
Floor Section/Area	5	9	233	367	614
	0.81%	1.47%	37.95%	59.77%	
Room Number	1	4	105	508	618
	0.16%	0.65%	16.99%	82.20%	